

DOCKET NO: 208608US0PCT

IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF :
THOMAS DANIEL, ET AL. : EXAMINER: METZMAIER
SERIAL NO: 09/831,915 :
FILED: MAY 25, 2001 : GROUP ART UNIT: 1712
FOR: HYDROGELS CAPABLE OF :
ABSORBING AQUEOUS FLUIDS :

APPEAL BRIEF

COMMISSIONER FOR PATENTS
ALEXANDRIA, VIRGINIA 22313

SIR:

This is an appeal from the Examiner's Final Rejection dated July 16, 2007, of
Claims 1-7, 10-14, 16-18, 20, 21, 23 and 24. A Notice of Appeal is being filed
herewith.

I. REAL PARTY IN INTEREST

The real party in interest is BASF Aktiengesellschaft of Ludwigshafen,
Germany, by virtue of the assignment recorded July 3, 2001, at Reel/Frame
011946/0298.

II. RELATED APPEALS AND INTERFERENCES

Appellants, Appellants' legal representative and their assignee are not aware of any other appeals or interferences which will directly affect or be directly affected by or having a bearing on the Board's decision in this appeal.

III. STATUS OF CLAIMS

The appealed claims are Claims 1-7, 10-14, 16-18, 20, 21, 23 and 24. Claims 1-7, 10-14, 16-18, 20, 21, 23 and 24 stand rejected.

The status of Claims 1-7, 10-14, 16-18, 20-21 and 23-24 is "previously presented". The status of Claims 8, 9, 15, 19 and 22 is "canceled".

IV. STATUS OF AMENDMENTS

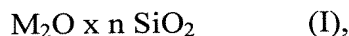
No Amendment under 37 C.F.R. §1.116 was filed.

V. SUMMARY OF CLAIMED SUBJECT MATTER

As claimed in **Claim 1**, the present application relates to a dried hydrogel, prepared by

polymerizing an olefinically unsaturated carboxylic acid or its salts in a polymerization reaction mixture;

admixing the polymerization reaction mixture, before, during or after the polymerization and before drying, with an alkali metal silicate of the general formula I



wherein M is an alkali metal and n is from 0.5 to 4;

postcrosslinking a resulting polymer;

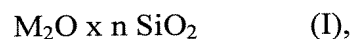
thereby obtaining a hydrogel containing said postcrosslinked polymer; and
drying said hydrogel at an elevated temperature, to obtain said dried hydrogel;
wherein said postcrosslinking is effected by a crosslinker which is a
compound containing two or more groups that form covalent bonds with the carboxyl
groups of said polymer.

See for example, page 1, lines 16-34, at page 2, lines 26-37, page 3, lines 26-31, of the specification and the claims as originally filed.

Claim 10 relates to a process for preparing dried hydrogel particles,
comprising:

polymerizing an olefinically unsaturated carboxylic acid or its salts in a
polymerization reaction mixture, to obtain a solid gel containing a polymer;

admixing the polymerization reaction mixture before or during the
polymerization or admixing said solid gel with an alkali metal silicate of the general
formula I



wherein M is an alkali metal and n is from 0.5 to 4;

thereby obtaining particles of a gel;

postcrosslinking said particles of the gel; and

drying said particles of the gel at an elevated temperature, to obtain said dried
hydrogel particles;

wherein said postcrosslinking is effected by a crosslinker which is a
compound containing two or more groups that form covalent bonds with the carboxyl
groups of said particles of the gel.

See for example, page 1, lines 16-34, at page 2, lines 26-37, page 3, lines 26-31, and the Examples of the specification and the claims as originally filed.

Claim 18 relates to dried hydrogel particles, prepared by
polymerizing an olefinically unsaturated carboxylic acid or its salt in a
polymerization reaction mixture, to obtain a solid gel containing a polymer;
admixing said solid gel with an alkali metal silicate of the general formula I

$$M_2O \times n SiO_2 \quad (I),$$

wherein M is an alkali metal and n is from 0.5 to 4;
thereby obtaining particles of a gel;
postcrosslinking said particles of the gel;
drying said particles of the gel at an elevated temperature, to obtain said dried
hydrogel particles;
wherein said postcrosslinking is effected by a crosslinker which is a
compound containing two or more groups that form covalent bonds with the carboxyl
groups of said particles of the gel.

See for example, page 1, lines 16-34, at page 2, lines 26-37, page 3, lines 26-31, and the Examples of the specification and the claims as originally filed.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

(A) Claims 1-3, 6, 7, 10-14, 16, 18, 20-21 and 23-24 stand rejected under 35 U.S.C. § 103(a) over Procter & Gamble (WO 97/46195) in view of Trinh et al (US 5,429,628) and Modern Superabsorbent Polymer Technology.

(B) Claims 4-5 and 17 stand rejected under 35 U.S.C. § 103(a) over Procter & Gamble (WO 97/46195) in view of Trinh et al (US 5,429,628).

VII. ARGUMENT

Ground (A)

Claims 1-3, 6, 7, 10-14, 16, 18, 20-21 and 23-24 stand rejected under 35 U.S.C. § 103(a) over Procter & Gamble (WO 97/46195) in view of Trinh et al (US 5,429,628) and Modern Superabsorbent Polymer Technology. That rejection is untenable and should not be sustained.

Claims 1, 10 and 18 are independent. Claims 1 and 18 relate to a dried hydrogel and Claim 10 relates to a method of making a hydrogel.

The present invention as set forth in **Claim 1** relates to a dried hydrogel, prepared by

polymerizing an olefinically unsaturated carboxylic acid or its salts in a polymerization reaction mixture;

admixing the polymerization reaction mixture, before, during or after the polymerization and before drying, with an alkali metal silicate of the general formula I



wherein M is an alkali metal and n is from 0.5 to 4;

postcrosslinking a resulting polymer;

thereby obtaining a hydrogel containing said postcrosslinked polymer; and

drying said hydrogel at an elevated temperature, to obtain said dried hydrogel;

wherein said postcrosslinking is effected by a crosslinker which is a compound containing two or more groups that form covalent bonds with the carboxyl groups of said polymer.

As a result of mixing the polymerization mixture with the alkali metal silicate **before drying**, the alkali metal silicate is necessarily distributed inside the particles of the gel that are obtained. Procter & Gamble, Trinh et al and Modern Superabsorbent Polymer Technology fail to disclose or suggest, alone or in combination, such process step and the necessary result of this step.

That the silicate is distributed throughout the polymer particles was also shown in the Declaration of Dr. Manfred Essig dated May 6, 2005. The Declaration was filed at the USPTO on May 9, 2005.

In addition, Procter & Gamble, Trinh et al lack a disclosure of post-crosslinking. While Modern Superabsorbent Polymer Technology generally discloses the use of post-cross-linking, there is no disclosure that a compound such as a alkali

metal silicate is first mixed with a polymer to be post-crosslinked. However, it makes a big difference to the structure of the product obtained. Clearly, a polymer that is post-crosslinked as disclosed in Modern Superabsorbent Polymer Technology **(without being first admixed with a compound)** is different from a polymer particle as obtained in the present invention in which a alkali metal silicate is distributed inside the polymer particle and which is then post-crosslinked.

Procter & Gamble, Trinh et al and Modern Superabsorbent Polymer Technology fail to disclose or suggest, alone or in combination, a dried hydrogel as claimed or a process of preparing a dried hydrogel as claimed in which a **polymerization reaction mixture**, before, during or after the polymerization and **before drying, is admixed with an alkali metal silicate.**

Procter & Gamble discloses an odour control system with silica, AGM and zeolites (page 6, 2nd paragraph). The term “AGM” means absorbent gelling material and is used as synonym for dried hydrogels or superabsorbent polymers. However, **AGM is not a polymerization mixture before drying. In fact, the Examiner states at page 3 of the Office Action of July 16, 2007, that AGM is a dried hydrogel. Since AGM is already a ready made hydrogel which is dried it is impossible to perform a step in Procter & Gamble in which a polymerization mixture is mixed with an alkali metal silicate before drying. Therefore such step is not suggested or motivated.**

Further, Procter & Gamble discloses that in one embodiment, the odour control system is produced using spray drying, spray mixing or agglomeration (page 6, last paragraph). These techniques relate to the processing of AGM with binder materials such as silica. However, there is **no disclosure or suggestion that a**

polymerization mixture before drying be used and admixed with the alkali metal silicate.

Moreover, in Procter & Gamble the silica acts as a binder (page 6, last paragraph) for the AGM particles. However, the silica is **NOT INSIDE THE AGM** particles but **is outside the particles to make them bind**. This is consistent with the fact that, as stated above, AGM is a ready made dried hydrogel that is mixed with the binder but not in such a way that the binder goes inside the AGM particles.

According to Procter & Gamble, the silica can be distributed homogeneously throughout the absorbent article (page 7, fourth paragraph). **This refers to the entire article not to a distribution within AGM particles.** Absorbent articles are i.e. sanitary napkins (page 1, first paragraph) and are not the superabsorbent particles themselves. Just because the articles have a distribution of silicate on macroscale, does not mean that the single AGM particles contained in the article have silicate distributed therein. The silicate in Procter & Gamble is a binder and thus sits outside the AGM particles to bind them. If the silicate was inside the AGM particles how would it bind them?

The particulates, granulates, flakes, noodles, and exudates (page 6, third paragraph) reads on mixtures of silica and zeolite only. This disclosure does not mean particles comprising superabsorbent polymers having silica inside.

Further according to the Examples of the present invention neutralization of the acid groups in the polymer particles occurs. In Example 1, a solution of soluble sodium silicate and sodium hydroxide is used wherein **74% of the acid groups of the hydrogel are neutralized.**

The result of the claimed invention are polymer particles **wherein the silicate is distributed throughout the particles** as shown in the Declaration of Dr. Manfred Essig dated May 6, 2005. The Declaration was filed at the USPTO on May 9, 2005.

Procter & Gamble refers to crystalline and amorphous silica that means particulate silica, only (page 5, second paragraph). **By mixing of different particulate materials it is impossible to get particles wherein the one material is distributed throughout the other material.** Thus, Procter & Gamble does not disclose a distribution of silica throughout the superabsorbent polymer particles (AGM).

Trinh et al discloses mixtures of superabsorbent particles and zeolite (column 25, lines 35-40). Kieselguhr can also be used (column 2, line 38). As shown in Kirk-Othmer "Encyclopedia of Chemical Technology" (IDS attached), "Kieselguhr" is a synonym for diatomite (page 109, first paragraph) and diatomite is a particulate material (page 108, first paragraph). **By wet mixing of different particulate materials it is impossible to get particles wherein the one material is distributed throughout the other material.** That means that Trinh et al does not disclose a distribution of silica throughout the superabsorbent polymer particles.

Further, a person skilled in the art had no motivation to replace a porous silica or silicate with a high surface area (Procter & Gamble, page 5, 2nd and 3rd paragraphs) by an alkali metal silicate solution. Solvated alkali metal silicates cannot have any pores. The photographs attached to the Declaration does not show any porous silicate.

Modern Superabsorbent Polymer Technology has only been cited to show post-crosslinking and does not cure the defects of Procter & Gamble in view of Trinh et al.

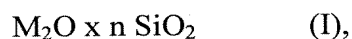
Even if Procter & Gamble, Trinh et al and Modern Superabsorbent Polymer Technology are combined, the present invention as claimed in Claim 1 cannot result.

Claim 10

Claim 10 relates to a process for preparing dried hydrogel particles, comprising:

polymerizing an olefinically unsaturated carboxylic acid or its salts in a polymerization reaction mixture, to obtain a solid gel containing a polymer;

admixing the polymerization reaction mixture before or during the polymerization or admixing said solid gel with an alkali metal silicate of the general formula I



wherein M is an alkali metal and n is from 0.5 to 4;

thereby obtaining particles of a gel;

postcrosslinking said particles of the gel; and

drying said particles of the gel at an elevated temperature, to obtain said dried hydrogel particles;

wherein said postcrosslinking is effected by a crosslinker which is a compound containing two or more groups that form covalent bonds with the carboxyl groups of said particles of the gel.

In the process of **Claim 10**, admixing of the polymerization reaction mixture is **before or during** the polymerization **or admixing the solid gel with an alkali metal silicate of the general formula I**, $M_2O \times n SiO_2$ (I), occurs.

The admixing of the polymerization mixture with alkali metal silicate has been discussed above for Claim 1 and applies here as well.

Further, the admixing the solid gel with an alkali metal silicate is followed by post-crosslinking. Procter & Gamble, Trinh et al lack a disclosure of post-crosslinking. While Modern Superabsorbent Polymer Technology generally discloses the use of post-cross-linking, there is no disclosure that a compound such as a alkali metal silicate is first mixed with a polymer to be post-crosslinked. However, it makes a big difference to the structure of the product obtained. Clearly, a polymer that is post-crosslinked as disclosed in Modern Superabsorbent Polymer Technology **(without being first admixed with a compound)** is different from a polymer particle as obtained in the present invention in which a alkali metal silicate is distributed inside the polymer particle and which is then post-crosslinked.

Even if Procter & Gamble, Trinh et al and Modern Superabsorbent Polymer Technology are combined, the present invention as claimed in Claim 10 cannot result.

Moreover, the Examples of the specification indicate that the hydrogels of the present invention have superior absorbency under load and gel layer permeability.

Example 1 has an absorbency under load of 20.9 g/g and a gel layer permeability of $3 (x10^{-7} \text{ cm}^3\text{sec/g})$. After solvent and heat treatment for surface post-

crosslinking, the absorbency under load is 24.7 g/g and the gel layer permeability is $60 \times 10^{-7} \text{ cm}^3 \text{ sec/g}$. See page 7, line 40 to page 8, line 11 of the specification.

Comparative Example 1 uses no sodium silicate and as a result the obtained product HAS NO GEL PERMEABILITY. After surface post crosslinking, the gel layer permeability is **three times lower** than Example 1 and only $20 \times 10^{-7} \text{ cm}^3 \text{ sec/g}$. See page 8, lines 15-25 of the specification.

Example 2 has, after surface post-crosslinking, an absorbency under load of 23.9 g/g and a gel layer permeability of $8 \times 10^{-7} \text{ cm}^3 \text{ sec/g}$. See page 9, lines 10-12 of the specification.

Comparative Example 2 uses no sodium silicate and has, after surface post crosslinking, a gel layer permeability which is **50% lower** than Example 2 and only $4 \times 10^{-7} \text{ cm}^3 \text{ sec/g}$. See page 9, line 22 of the specification.

Example 3 has an absorbency under load of 21.4 g/g and a gel layer permeability of $4 \times 10^{-7} \text{ cm}^3 \text{ sec/g}$ and centrifuge retention of 31.3 g/g. See page 9, lines 36-38 of the specification.

Comparative Example 3 uses no sodium silicate and has an absorbency under load of 20.9 g/g and a gel layer permeability which is **4 times lower** than Example 3 and only $1 \times 10^{-7} \text{ cm}^3 \text{ sec/g}$ and a centrifuge retention of 31.8 g/g. See page 10, lines 5-6 of the specification.

Moreover, **Examples 4-9** are superior to **Comparative Example 4** in absorbency under load and a gel layer permeability and centrifuge retention, as shown in Table 1 at page 11 of the specification.

Examples 10-15 are superior to **Comparative Example 4a** in absorbency under load and a gel layer permeability and centrifuge retention, as shown in Table 2 at pages 11 and 12 of the specification.

Examples 17-19 are superior to **Comparative Example 16** in absorbency under load and a gel layer permeability and centrifuge retention, as shown in Table 3 at pages 12 and 13 of the specification.

Examples 21-24 are superior to **Comparative Example 20** in gel layer permeability and centrifuge retention, as shown in Table 4 at pages 13 of the specification.

Example 25 has an absorbency under load of 21.6 g/g and a centrifuge retention of 30.0 g/g. After surface post-crosslinking, the absorbency under load is 24 g/g and the gel layer permeability is 62 ($\times 10^{-7}$ cm³sec/g). See page 14, lines 21-38 of the specification.

Comparative Example 25 uses no sodium silicate and has an absorbency under load of 12 g/g and a centrifuge retention of 32.8 g/g. After surface post-crosslinking, the absorbency under load is 24 g/g and the gel layer permeability is 33 ($\times 10^{-7}$ cm³sec/g) and the centrifuge retention is 28 g/g. See page 15, lines 4-14 of the specification.

Procter & Gamble, Trinh et al and Modern Superabsorbent Polymer Technology, alone or in combination do not suggest the superior results of the present invention obtained when using sodium silicate solution followed by post-crosslinking.

Claim 18

Claim 18 relates to dried hydrogel particles, prepared by polymerizing an olefinically unsaturated carboxylic acid or its salt in a polymerization reaction mixture, to obtain a solid gel containing a polymer;
admixing said solid gel with an alkali metal silicate of the general formula
I



wherein M is an alkali metal and n is from 0.5 to 4;

thereby obtaining particles of a gel;
postcrosslinking said particles of the gel;
drying said particles of the gel at an elevated temperature, to obtain said dried hydrogel particles;
wherein said postcrosslinking is effected by a crosslinker which is a compound containing two or more groups that form covalent bonds with the carboxyl groups of said particles of the gel.

The admixing the solid gel with an alkali metal silicate is followed by post-crosslinking. Procter & Gamble, Trinh et al lack a disclosure of post-crosslinking. While Modern Superabsorbent Polymer Technology generally discloses the use of post-cross-linking, there is no disclosure that a compound such as an alkali metal

silicate is first mixed with a polymer to be post-crosslinked. However, it makes a big difference to the structure of the product obtained. Clearly, a polymer that is post-crosslinked as disclosed in Modern Superabsorbent Polymer Technology (**without being first admixed with a compound**) is different from a polymer particle as obtained in the present invention in which a alkali metal silicate is distributed inside the polymer particle and which is then post-crosslinked.

Even if Procter & Gamble, Trinh et al and Modern Superabsorbent Polymer Technology are combined, the present invention as claimed in Claim 10 cannot result.

Claim 2:

Claim 2 is separately patentable because Procter & Gamble, Trinh et al and Modern Superabsorbent Polymer Technology, alone or in combination, fail to disclose or suggest that the dried hydrogel as claimed in claim 1, is prepared by admixing said alkali metal silicate in an amount of from 0.05% by weight to 100% by weight, reckoned on SiO₂ and based on a total monomer weight.

Claim 3:

Claim 3 is separately patentable because Procter & Gamble, Trinh et al and Modern Superabsorbent Polymer Technology, alone or in combination, fail to disclose or suggest that the dried hydrogel as claimed in claim 1, is prepared by admixing said alkali metal silicate in an amount of from 1% by weight to 70% by weight, reckoned on SiO₂ and based on a total monomer weight.

Claim 6:

Claim 6 is separately patentable because Procter & Gamble, Trinh et al and Modern Superabsorbent Polymer Technology, alone or in combination, fail to disclose or suggest that the dried hydrogel as claimed in claim 1, is prepared by neutralizing said polymer contained in said hydrogel to a pH of from 3.5 to 9.0.

Claim 7:

Claim 7 is separately patentable because Procter & Gamble, Trinh et al and Modern Superabsorbent Polymer Technology, alone or in combination, fail to disclose or suggest that the dried hydrogel as claimed in claim 1 is dried at a temperature in the range from 40°C to 300°C.

Claim 11:

Claim 11 is separately patentable because Procter & Gamble, Trinh et al and Modern Superabsorbent Polymer Technology, alone or in combination, fail to disclose or suggest a method for absorbing aqueous solutions, dispersions and emulsions, comprising:

contacting the dried hydrogel according to claim 1 with an aqueous solution, dispersion or emulsion.

Claim 12:

Claim 12 is separately patentable because Procter & Gamble, Trinh et al and Modern Superabsorbent Polymer Technology, alone or in combination, fail to disclose or suggest an article, comprising:

the dried hydrogel according to Claim 1;

said article being capable of absorbing an aqueous fluid.

Claim 13:

Claim 13 is separately patentable because Procter & Gamble, Trinh et al and Modern Superabsorbent Polymer Technology, alone or in combination, fail to disclose or suggest that the dried hydrogel according to claim 1 is capable of absorbing an aqueous fluid.

Claim 14:

Claim 14 is separately patentable because Procter & Gamble, Trinh et al and Modern Superabsorbent Polymer Technology, alone or in combination, fail to disclose or suggest that the olefinically unsaturated carboxylic acid of the dried hydrogel according to claim 1, is selected from the group consisting of acrylic acid, methacrylic acid, crotonic acid, 2-acryl-amido-2-methylpropanesulfonic acid, 2-acryl-amido-2-methylpropanephosphonic acid, vinylphosphonic acid and mixtures thereof.

Claim 16:

Claim 16 is separately patentable because Procter & Gamble, Trinh et al and Modern Superabsorbent Polymer Technology, alone or in combination, fail to disclose or suggest that M in formula (I) is sodium for the dried hydrogel according to claim 1.

Claim 20:

Claim 20 is separately patentable because Procter & Gamble, Trinh et al and Modern Superabsorbent Polymer Technology, alone or in combination, fail to

disclose or suggest that the dried hydrogel according to claim 1 has a polymer which is water-insoluble.

Claim 21:

Claim 21 is separately patentable because Procter & Gamble, Trinh et al and Modern Superabsorbent Polymer Technology, alone or in combination, fail to disclose or suggest that the dried hydrogel according to claim 1 has a polymer which is a copolymer.

Claim 23:

Claim 23 is separately patentable because Procter & Gamble, Trinh et al and Modern Superabsorbent Polymer Technology, alone or in combination, fail to disclose or suggest that the dried hydrogel according to claim 1 is prepared by using an alkali metal silicate which is soluble in water. While Procter & Gamble disclose sodium silicate (page 5, 2nd paragraph), the same paragraph also discloses crystalline and amorphous silica. Not every sodium silicate is water soluble as claimed in Claim 23. See also Ullmann's Encyclopedia of Industrial Chemistry, Vol. 32 (IDS attached) which categorizes sodium silicate as soluble and solid silicate (see page 412, left column). There is no disclosure or suggestion in Procter & Gamble, Trinh et al and Modern Superabsorbent Polymer Technology to use soluble sodium silicate instead of crystalline or amorphous sodium silicate.

Claim 24:

Claim 24 is separately patentable because Procter & Gamble, Trinh et al and Modern Superabsorbent Polymer Technology, alone or in combination, fail to

disclose or suggest that the dried hydrogel according to claim 1, is prepared by admixing the alkali metal silicate with said polymerization reaction mixture after the polymerization and before drying.

Thus, Claims 1-3, 6, 7, 10-14, 16, 18, 20-21 and 23-24 are Not Obvious over Procter & Gamble (WO 97/46195) in view of Trinh et al (US 5,429,628) and Modern Superabsorbent Polymer Technology within the meaning of 35 U.S.C. §103(a). For all the above reasons, it is respectfully requested that this rejection be REVERSED.

Ground (B)

Claims 4-5 and 17 stand rejected under 35 U.S.C. § 103(a) over Procter & Gamble (WO 97/46195) in view of Trinh et al (US 5,429,628). That rejection is untenable and should not be sustained.

Claims 4, 5 and 17 are dependent claims and are Not obvious over Procter & Gamble in view of Trinh et al for the reasons discussed in ground (A), above.

Claim 4:

Claim 4 is separately patentable because Procter & Gamble and Trinh et al, alone or in combination, fail to disclose or suggest that the dried hydrogel as claimed in claim 1, is prepared by **admixing said hydrogel after said polymerization with a mixture of an alkali metal silicate and an alkali metal hydroxide**, to thereby neutralize said polymer contained in said hydrogel.

Claim 5:

Claim 5 is separately patentable because Procter & Gamble and Trinh et al, alone or in combination, fail to disclose or suggest that the dried hydrogel as claimed in claim 1, is prepared by admixing said hydrogel **after said polymerization** with a mixture of an alkali metal silicate and an alkali metal carbonate, to thereby neutralize said polymer contained in said hydrogel.

Claim 17:

Claim 17 is separately patentable because Procter & Gamble and Trinh et al, alone or in combination, fail to disclose or suggest the dried hydrogel according to claim 1, wherein M in formula (I) is potassium.

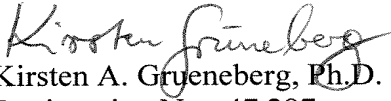
Thus, Claims 4-5 and 17 are Not Obvious over Procter & Gamble (WO 97/46195) in view of Trinh et al (US 5,429,628) within the meaning of 35 U.S.C. §103(a). For all the above reasons, it is respectfully requested that this rejection be REVERSED.

CONCLUSION

For the above reasons, it is respectfully requested that all the rejections still pending in the Final Office Action be REVERSED.

Respectfully submitted,

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VIII. CLAIMS APPENDIX

Claim 1: A dried hydrogel, prepared by

polymerizing an olefinically unsaturated carboxylic acid or its salts in a polymerization reaction mixture;

admixing the polymerization reaction mixture, before, during or after the polymerization and before drying, with an alkali metal silicate of the general formula I

$$M_2O \times n SiO_2 \quad (I),$$

wherein M is an alkali metal and n is from 0.5 to 4;

postcrosslinking a resulting polymer;

thereby obtaining a hydrogel containing said postcrosslinked polymer; and

drying said hydrogel at an elevated temperature, to obtain said dried hydrogel;

wherein said postcrosslinking is effected by a crosslinker which is a compound containing two or more groups that form covalent bonds with the carboxyl groups of said polymer.

Claim 2: The dried hydrogel as claimed in claim 1, prepared by admixing said alkali metal silicate in an amount of from 0.05% by weight to 100% by weight, reckoned on SiO₂ and based on a total monomer weight.

Claim 3: The dried hydrogel as claimed in claim 1, prepared by admixing said alkali metal silicate in an amount of from 1% by weight to 70% by weight, reckoned on SiO₂ and based on a total monomer weight.

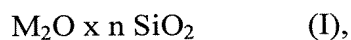
Claim 4: The dried hydrogel as claimed in claim 1, prepared by admixing said hydrogel after said polymerization with a mixture of an alkali metal silicate and an alkali metal hydroxide, to thereby neutralize said polymer contained in said hydrogel.

Claim 5: The dried hydrogel as claimed in claim 1, prepared by admixing said hydrogel after said polymerization with a mixture of an alkali metal silicate and an alkali metal carbonate, to thereby neutralize said polymer contained in said hydrogel.

Claim 6: The dried hydrogel as claimed in claim 1, prepared by neutralizing said polymer contained in said hydrogel to a pH of from 3.5 to 9.0.

Claim 7: The dried hydrogel as claimed in claim 1, wherein a drying temperature is in the range from 40°C to 300°C.

Claim 10: A process for preparing dried hydrogel particles, comprising:
polymerizing an olefinically unsaturated carboxylic acid or its salts in a polymerization reaction mixture, to obtain a solid gel containing a polymer;
admixing the polymerization reaction mixture before or during the polymerization or admixing said solid gel with an alkali metal silicate of the general formula I



wherein M is an alkali metal and n is from 0.5 to 4;
thereby obtaining particles of a gel;
postcrosslinking said particles of the gel; and

drying said particles of the gel at an elevated temperature, to obtain said dried hydrogel particles;

wherein said postcrosslinking is effected by a crosslinker which is a compound containing two or more groups that form covalent bonds with the carboxyl groups of said particles of the gel.

Claim 11: A method for absorbing aqueous solutions, dispersions and emulsions, comprising:

contacting the dried hydrogel according to claim 1 with an aqueous solution, dispersion or emulsion.

Claim 12: An article, comprising:

the dried hydrogel according to Claim 1;

said article being capable of absorbing an aqueous fluid.

Claim 13: The dried hydrogel according to claim 1 which is capable of absorbing an aqueous fluid.

Claim 14: The dried hydrogel according to claim 1, wherein said olefinically unsaturated carboxylic acid is selected from the group consisting of acrylic acid, methacrylic acid, crotonic acid, 2-acryl-amido-2-methylpropanesulfonic acid, 2-acryl-amido-2-methylpropanephosphonic acid, vinylphosphonic acid and mixtures thereof.

Claim 16: The dried hydrogel according to claim 1, wherein M in formula (I) is sodium.

Claim 17: The dried hydrogel according to claim 1, wherein M in formula (I) is potassium.

Claim 18: Dried hydrogel particles, prepared by
polymerizing an olefinically unsaturated carboxylic acid or its salt in a
polymerization reaction mixture, to obtain a solid gel containing a polymer;
admixing said solid gel with an alkali metal silicate of the general formula I

$$M_2O \times n SiO_2 \quad (I),$$

wherein M is an alkali metal and n is from 0.5 to 4;
thereby obtaining particles of a gel;
postcrosslinking said particles of the gel;
drying said particles of the gel at an elevated temperature, to obtain said dried
hydrogel particles;
wherein said postcrosslinking is effected by a crosslinker which is a
compound containing two or more groups that form covalent bonds with the carboxyl
groups of said particles of the gel.

Claim 20: The dried hydrogel according to claim 1, wherein said polymer is water-insoluble.

Claim 21: The dried hydrogel according to claim 1, wherein said polymer is a copolymer.

Claim 23: The dried hydrogel according to claim 1, wherein said alkali metal silicate is soluble in water.

Claim 24: The dried hydrogel according to claim 1, wherein said alkali metal silicate is admixed with said polymerization reaction mixture after the polymerization and before drying.

IX. EVIDENCE APPENDIX

None.

X. RELATED PROCEEDINGS APPENDIX

None.